

Interactive comment on “Quantification of transport across the boundary of the lower stratospheric vortex during Arctic winter 2002/2003” by G. Günther et al.

Anonymous Referee #1

Received and published: 8 January 2008

This manuscript presents a study on the quantification of the transport across the vortex boundary using an advection model and data from airborne instruments. It shows clearly the ability of CLaMS model to reproduce the filamentation of air inside the vortex and is an interesting contribution to the understanding of the mechanisms of air exchange between the polar vortex and mid-latitudes.

Major comment : One of the main conclusions of the authors, last paragraph of the abstract, is the small impact of polar ozone loss on mid-latitude ozone before the vortex break up. I consider that this conclusion should be moderated and more discussed. The fraction of 6% of polar air exported in mid-latitude by end of March should be put

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

Interactive
Comment

in relation of the relative areas covered by the vortex air at the beginning of the run (9% of North hemisphere area if I estimate a South limit at 65°N in equivalent latitude for vortex air from Figure 15) and the area of the latitude band 30°-60N (36% of the North hemisphere). It means that about 24% percent of the vortex air has been exported to mid-latitude which is not negligible. Furthermore, in terms of the relative contribution to ozone depletion at mid-latitude, the contribution of exported polar air may be much higher because the in-situ mid-latitude depletion is much weaker. The authors do not indicate if they consider their result as a new one and do not compare with previously published studies (see the section on Export from vortex; in the WMO Report 2006 on Ozone Depletion 2006, pages 3.28 to 3.30, where several studies are reported). I have the feeling that their results are not in contradiction with previous publications but that they are presented in a different way.

I agree with Referee #2's comment on the need to divide in sub-chapters and to give summary and conclusions for each chapter.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 17559, 2007.

[Full Screen / Esc](#)[Printer-friendly Version](#)[Interactive Discussion](#)[Discussion Paper](#)